Federal Aviation Administration
APNT Industry Day
NextGen APNT Background

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NextGen NAS Lifecycle Integration, ANG-D

MAY 3, 2012

NextGen 2025 OV-1

Net Centric Operations

SOA CORE SERVICES
Messaging Services | Interface Management | Security Service | Enterprise Services Mgt | Collaboration Services

SUPPORT SERVICES
Content Management | Data Acquisition

ENTERPRISE GOVERNANCE
SOA Governance | Run-time Management

ADMINISTRATIVE SERVICES
Data/Network Support Services | Services Provisioning Management | Trainin Suppo

The Need for APNT

Destination 2025 NextGen Operational Concepts

- The NAS is transitioning to Performance-Based Navigation (PBN) Area Navigation (RNAV) and Required Navigation Performance (RNP) enabled by GNSS

Capability Shortfalls

- GPS is vulnerable to radio frequency interference (RFI) caused outages
- National Policy requires FAA to provide a backup to GPS
- PBN, TBO, and ADS-B would be impacted in the event of a GPS outage
- The VOR navigation aids are not suitable enablers for RNAV and RNP
- Distance Measuring Equipment (DME) is not currently approved for RNP operations or for RNAV operations below 1.0nm
- Automatic Dependent Surveillance Broadcast (ADS-B) is currently dependent on GPS positioning

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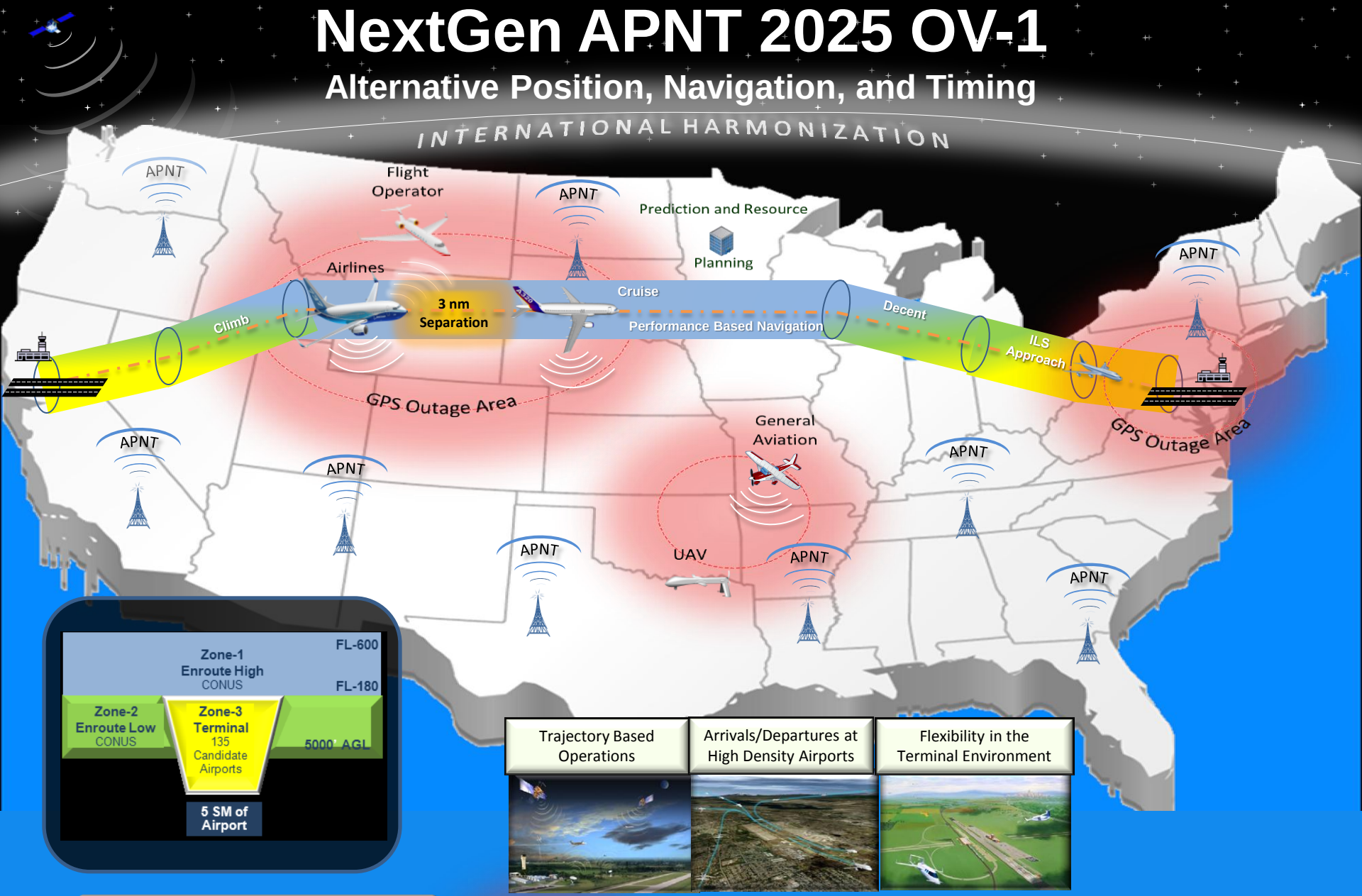
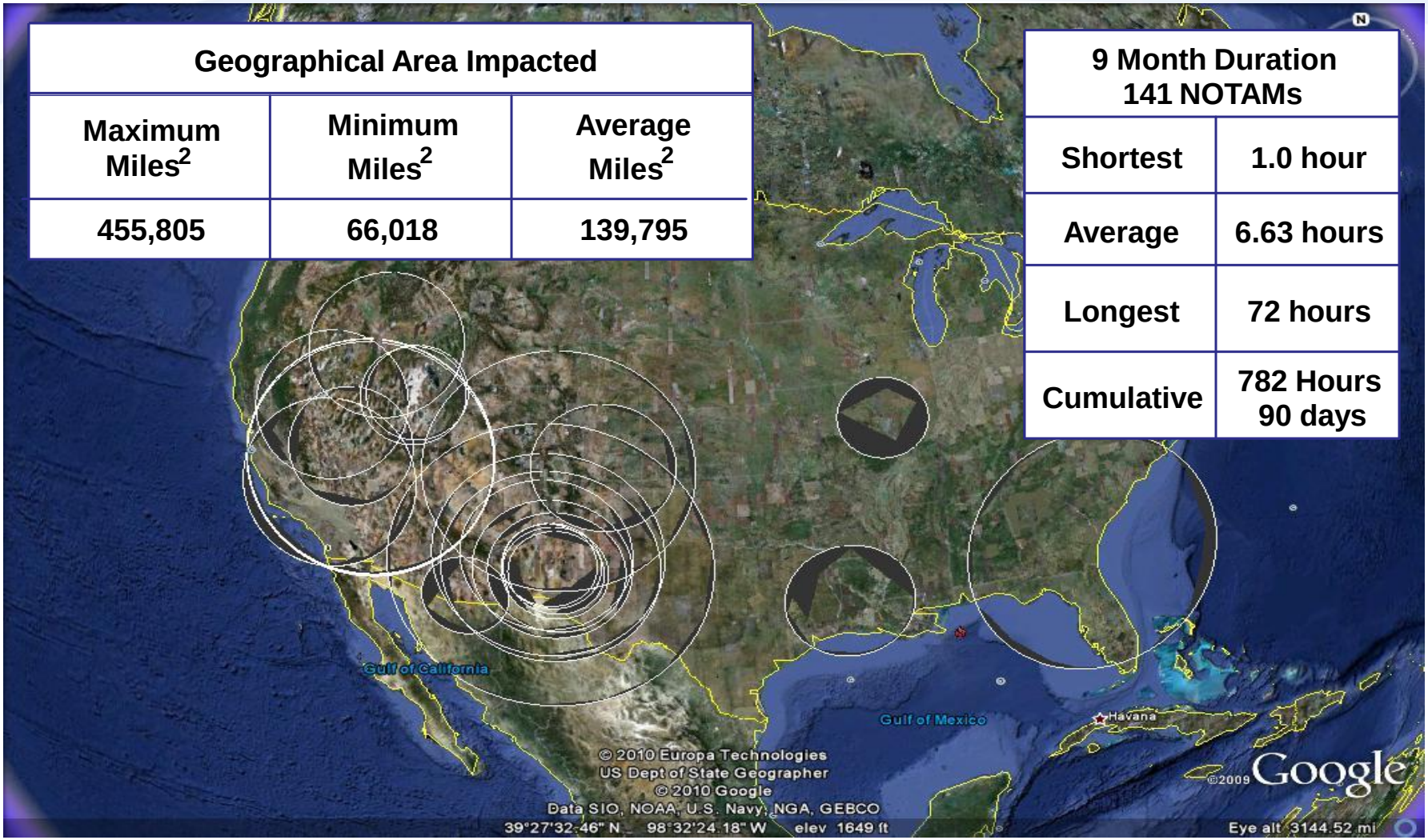
Alternative Position, Navigation, and Timing



Historic Outages



Geographical Area Impacted		
Maximum Miles^2	Minimum Miles^2	Average Miles^2
455,805	66,018	139,795

9 Month Duration 141 NOTAMs	
Shortest	1.0 hour
Average	6.63 hours
Longest	72 hours
Cumulative	782 Hours 90 days

FAA

NextGEN

Availability of Personal Privacy Devices

$110 Ebay

$335 Ebay

$92 Ebay

$40 GPS&GSM

$55 Ebay

$83 GPS&GSM

$152 Ebay

FAA

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APNT Mission

- Maintain Safety and Security while minimizing economic impacts during a GPS outage due to RFI
- Enable a smooth transition to backup navigation that supports continued operations where economically beneficial
- Minimize impacts on NextGen operational benefits during a GPS RFI event
  - Fuel Consumption
  - Emissions
  - Travel Time

FAA

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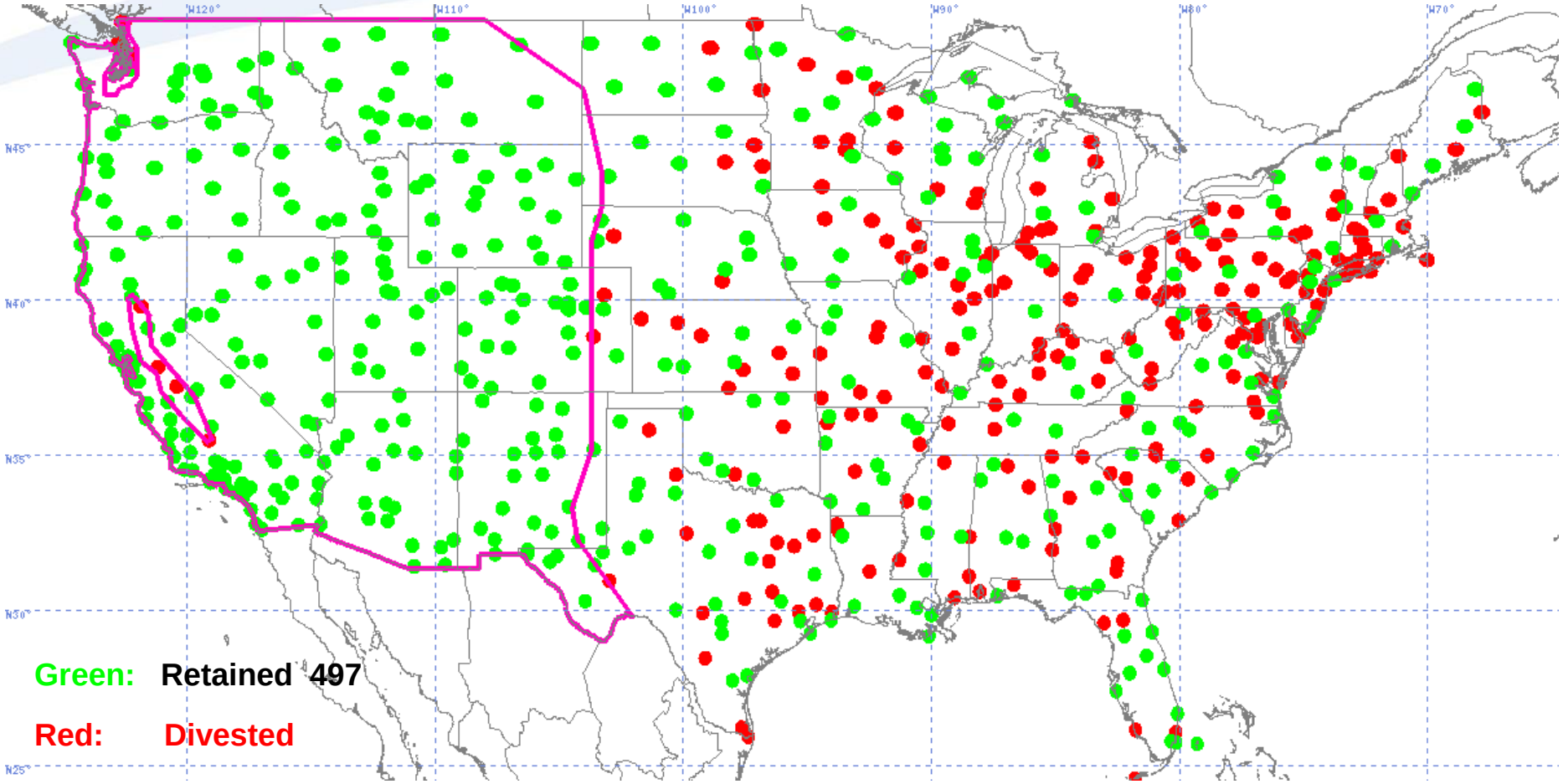
VOR Minimum Operating Network



Aircraft will be able to navigate at or above 5,000 ft AGL, VOR to VOR and to proceed to an airport within 100 NM and land at that airport using non-GNSS-based landing aids, i.e., an ILS, Localizer, or VOR-based approach.

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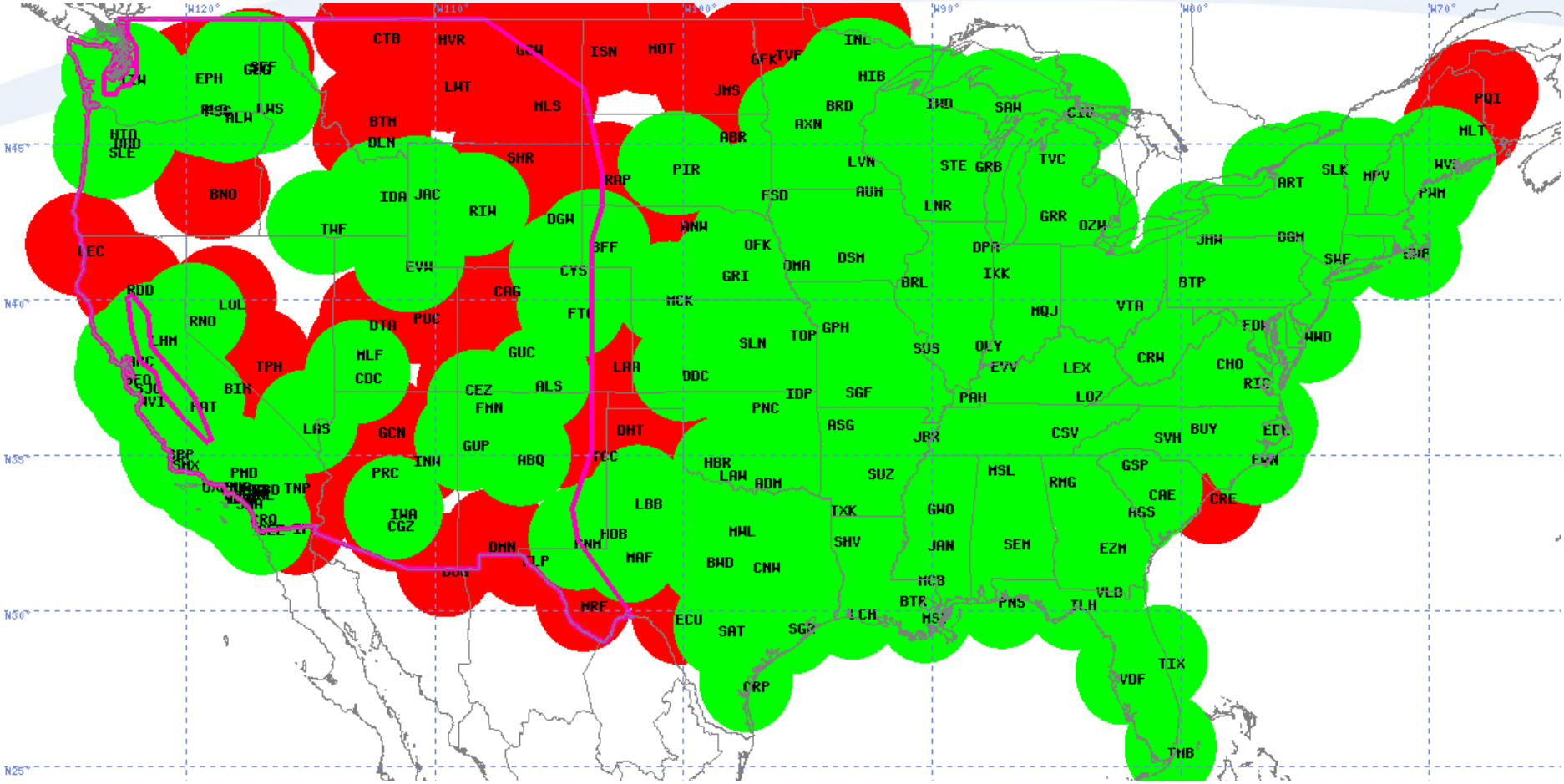
MON Airports



MON Airports with ILS or Localizer Approaches **(Green Circles)** or VOR Approaches **(Red Circles)**

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DME Strategy

Coverage > 18,000 MSL

- 1100 existing DMEs
- Upgrade 112 facilities
- Add 8 DMEs to fill coverage
- Enable DME/DME aircraft to fly RNAV to an ILS
- Terminal DME gap filler numbers are TBD

FAA

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Summary

- NextGen Operational Improvements enabled by performance based navigation capabilities increases dependence on GPS and alternate PNT services
- GPS radio frequency interference (RFI) requires mitigation
  - Waiting for the interference source to be turned off is unacceptable
  - Continuity of operations must be assured at high density airports
- Existing conventional navigation infrastructure does not meet future performance needs
  - VOR is not a suitable enabler for PBN
  - DME/DME/IRU is not approved for less than RNAV 1.0nm
  - DME/DME/IRU is not approved for RNP
- Alternatives are being studied for further consideration